SAFETY, MISSION ASSURANCE, ENGINEERING AND ADVANCED CONCEPTS

FISCAL YEAR 2001 ESTIMATES

BUDGET SUMMARY

OFFICE OF SAFETY & MISSION ASSURANCE — **SAFETY, MISSION ASSURANCE, ENGINEERING & ADVANCED CONCEPTS**
OFFICE OF THE CHIEF ENGINEER
OFFICE OF THE CHIEF TECHNOLOGIST

	FY 1999 OPLAN 12/23/99	FY 2000 OPLAN REVISED	FY 2001 PRES BUDGET
		(Thousands of Dollars)	
Safety and Mission Assurance	25,900	25,200	25,200
Engineering	5,300	13,100	17,500
Advanced Concepts	4,400	4,700	4,800
Total	35,600	43,000	47,500
Distribution of Program Amount by Installation			
Johnson Space Center	6,982	6,934	6,860
Kennedy Space Center	1,244	880	965
Marshall Space Flight Center	2,204	2,255	2,555
Stennis Space Center	119	170	125
Ames Flight Research Center	6,399	5,950	5,725
Dryden Research Center	255	350	425
Langley Research Center	3,665	5,148	7,180
Glenn Research Center	1,528	2,183	2,160
Goddard Space Flight Center	6,149	7,903	8,900
Jet Propulsion Laboratory	3,589	6,947	7,755
Headquarters	3,466	4,280	4,850
Total	35,600	43,000	47,500

GENERAL

The Safety, Mission Assurance, Engineering, and Advanced Concepts (SMAEAC) budget supports the activities of the Office of Safety and Mission Assurance (OSMA), the Office of the Chief Engineer (OCE), and the Office of the Chief Technologist (OCT). These three Offices advise the Administrator, oversee NASA programs, develop Agency-wide policies and standards, and support the technology requirements of NASA flight programs.

PROGRAM GOALS

SMAEAC's goal is to enable safe and successful NASA programs. SMAEAC funding is an investment that generates policies, guidance, tools, independent reviews, and other outputs to provide conditions in which programs can be safe and successful.

STRATEGY FOR ACHIEVING GOALS

The Safety and Mission Assurance (SMA) area assures that sound and robust SMA processes and tools are in place to enable safe and successful missions. This area establishes SMA strategies, policies, and standards, and ensures that SMA disciplines are appropriately applied throughout the program life cycle. SMA also provides analysis, oversight, and independent assessment (IA) of programs, and flight & ground operations to ensure that suitable attention is placed on risk, missions are conducted safely, and there is a high probability of meeting Agency objectives. SMA funds research, development, pilot project application, and evaluation of tools, techniques, and practices that advance NASA's SMA capabilities in areas such as facility and operational safety, risk management, human reliability, software assurance, and probabilistic risk analysis. Funding is also provided to develop SMA training courses.

The Office of the Chief Engineer (OCE), funded under the 'Engineering' line, oversees NASA's strategic crosscutting processes to "Provide Aerospace Products and Capabilities" and independently evaluates ongoing programs, proposed concepts, and options for new programs. The OCE establishes policies, standards, and technical capabilities to improve NASA engineering practices. The NASA Electronics Program supports evaluation and introduction of advanced electronic parts and packaging technology into NASA programs.

The Office of the Chief Technologist (OCT), funded under the 'Advanced Concepts' line, is NASA's overall advocate for advanced technology. As such, the OCT advises the Administrator on technology matters and develops a NASA-wide investment strategy for innovative and advanced technology. The office leads the development of NASA-wide technology goals and objectives and oversees NASA technology policies, programs, processes, and capabilities. OCT also sponsors the NASA Institute for Advanced Concepts (NIAC), which helps advance potentially revolutionary technologies that may enable NASA strategic objectives requiring technology readiness ten to twenty years into the future.

ACCOMPLISHMENTS AND PLANS

In FY 1999, NASA achieved a lost time injury rate of 0.19 incidents per 200,000 workhours against a goal of 0.32. (Note: while the FY 1999 injury rate was unusually low, the goal does reflect progress on the historical trend.) FY 1999 saw research, development, pilot application, and evaluation of SMA tools, techniques and practices in disciplines such as operational and facility safety, risk management, quantitative risk analysis, software assurance, failure detection and prevention, and human reliability with the goal of enabling NASA safety and mission success. Revisions to SMA policies and guidance (NASA Occupational Safety and Health

Programs; NASA Safety Manual; Emergency Preparedness Program Plan, Process and Guidelines; Planning, Developing and Managing an Effective Reliability and Maintainability Program) were completed. OSMA provided support to and independent review of the International Space Station (ISS), Space Shuttle (4 missions), and science programs (including 9 expendable launch vehicle (ELV) payload launches). More than 3,000 students received SMA training. All NASA installations were third-party certified to ISO 9001, and all Centers completed the first round of SMA Process Verifications to review SMA process effectiveness and efficiency. An Agency Safety Initiative was developed and deployed. NASA assurance processes for expendable launch vehicles (ELVs) were evaluated and a Radiological Emergency Response Plan for Cassini's Earth gravity assist was developed. Within the Office of the Chief Engineer (OCE), five Independent Assessments of planned programs (including X38-CRV), and 25 Independent Annual Reviews (IARs) of ongoing programs were conducted in FY 1999. To implement OMB Circular A-119 and PL 104-113, 700 private Voluntary Consensus Standards (VCS) were processed for NASA adoption. 11 NASA Technical Standards were added to the NASA Preferred Technical Standards System and several NASA-led international standards for space systems were published by ISO. Management of the NASA Electronics Program (NEP) transferred from the Office of Space Science to OCE in FY 1999. This ongoing effort performs radiation testing and application readiness assessments of advanced electronics technologies. A simplified dynamic test method to reduce project testing cost and schedule was verified by conducting a flight experiment on STS 96. Within the Office of the Chief Technologist (OCT), the NIAC awarded FY 1999 Phase II studies. An inventory of NASA's technology investments along with long-term technology planning efforts were also supported.

The FY 2000 safety goal is 0.30 lost time incidents per 200,000 workhours. ISS independent review continues. Support and review will be provided to 7 Shuttle and 13 ELV and payload missions. OSMA will continue to identify, develop, update, and evaluate SMA tools, techniques and practices (including risk management, operational safety, quantitative risk analysis, software assurance, failure detection and prevention, and human reliability) to enable safety and mission success. Activities to maintain ISO 9001 certification, subsequent rounds of Process Verifications, and SMA training will continue. Policy and process evaluations will be conducted as needed in FY 2000, and any missions carrying nuclear materials will be reviewed for safety. In OCE, ten programmatic Independent Assessments, including Deep Space-3 and Next Generation Space Telescope are anticipated in FY 2000. Integration of VCS into the NASA system completes in FY 2000. Development of NASA and international standards continues. NEP funding is transferred to OCE in FY 2000 to align program management with funding, and integration of various databases on electronics will be initiated. The National Research Council assessment of Advanced Engineering Environments will complete in FY 2000. Cost estimating and analysis efforts will be improved and focused to support various program reviews and the Independent Assessment function. In OCT, NIAC will award new rounds of Phase I studies in FY 2000. Technology inventory and planning efforts continue.

FY 2001's lost time injury rate goal is 0.28 incidents per 200,000 workhours. Independent review of the ISS continues beyond FY 2001, and 8 Shuttle and 11 ELV and payload missions will be supported. OSMA will continue to identify, develop, update, and evaluate SMA tools, techniques and practices (including risk management, operational safety, quantitative risk analysis, software assurance, failure detection and prevention, and human reliability) to enable safety and mission success. Activities to maintain ISO 9001 certification, subsequent rounds of Process Verifications, and SMA training will continue. Policy and process evaluations will be conducted as needed through FY 2001, and any missions carrying nuclear materials will be reviewed for safety. In OCE, IARs continue, and about 10 programmatic Independent Assessments are anticipated. The NASA Preferred Standards system, with on-line access to adopted standards, will be fully operational in FY 2001, and development of NASA Technical Standards and international standards will continue. NEP will develop new methods for technology qualification and reliability assessment based on modeling and physics of failure in FY 2001, and electronics database integration completes. The cost estimating and analysis function will be fully operational. Systems engineering efforts will be realigned to support the Systems

Management function and complement the ISE in FY 2001. In OCT, NIAC will award another round of Phase I studies as well as Phase II follow-ons to the FY 2000 Phase I studies in FY 2001. Technology inventory and planning support will continue.